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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/817,843	03/26/2001	John U. Knickerbocker	END000008US1	9394

7590

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EXAMINER

ANDUJAR, LEONARDO

ART UNIT

PAPER NUMBER

2826

DATE MAILED: 04/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/817,843

Applicant(s)

KNICKERBOCKER ET AL.

Examiner

Leonardo Andújar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 17-21 and 35-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 17-21 and 35-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Acknowledgment

1. The amendment filed on 02/19/2003, paper no. 11, in response to the Office action mailed on 11/19/2002 has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 1-3, 17-21 and 35-37.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1-3, 9 and 17-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Elenius et al. (US 6,441,487).

5. Regarding claim 1, Elenius (e.g. figs. 1 and 2) shows an electronic package comprising:

➤ A dielectric substrate 22 having a major surface (top surface);

- And a conductive foil 30 having a smooth portion;
6. The conductive foil is laminated with the substrate major surface. Also, the smooth portion contacts the major surface of the dielectric substrate.
7. Regarding claim 2, Elenius discloses that the conductive foil may comprise aluminum, nickel or copper (col. 7/lls. 1-28).
8. Regarding claim 3, Elenius discloses that the conductive foil may comprise a high electrical conductivity material such as aluminum, nickel, titanium or copper (col. 7/lls. 1-28).
9. Regarding claim 17, Elenius (e.g. figs. 1 and 2) shows an electronic package comprising:
- A semiconductor substrate 12 having a major surface;
 - A first mechanically compliant dielectric layer 22 formed over the major surface of the substrate and having a at least one first opening formed therethrough;
 - A first electrical contact pad 18 formed in the first opening and in electrical contact with the substrate;
 - A second mechanically compliant dielectric layer 24 formed over the first compliant layer and having at least one second opening formed therethrough wherein the second opening is substantially offset from the first opening
 - A second electrical conductive pad 30 formed in the second opening and extending over a portion of the first electrical contact pad and contacting the first electrical contact pad;

- A mask layer 32 formed over the second compliant layer and having a third opening therethrough in communication with the second electrical contact pad;
 - And a solder ball 28 solderably connected to the second electrical contact pad and extending through the third opening.
10. Regarding claim 18, Elenius shows that the mask is a solder mask.
11. Regarding claim 19, Elenius shows that the compliant layers can be made of benzocyclobutene. Benzocyclobutene is a photoresist material (e.g. US 6,361,926, col.1/lis. 56-59).
12. Regarding claim 20 and 21, Elenius discloses that the contact pads may comprise aluminum, nickel or copper (col. 7/lis. 1-28).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

15. Claims 35-37 are rejected under 35 U.S.C. 103(a) as being obvious over Elenius et al. (US 6,441,487) in view of Gotoh et al. (US 6,204,454).

16. Regarding claims 35 and 36, Elenius shows most aspects of the instant invention including a contact pad laminated surface adhesion. However, Elenius does not disclose the specific roughness of the conductive surface. Gotoh discloses a conductive foil having a roughness in a range of 0.3 to 0.5 microns (col. 7/lls. 9-11). Gotoh discloses that this type of embodiment improves the electrical connection stability (col. 5/lls. 34-41). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make conductive surface disclosed by Elenius having a roughness in a range of 0.3-0.5 microns in order to improve the electrical connection stability as suggested by Gotoh.

17. Regarding claim 36, Elenius in view of Gotoh does not disclose that the roughness is less than 0.01 microns. However, the specific roughness claimed by applicant, i.e., less than 0.01 microns, absent any criticality, is only considered to be the "optimum" roughness value of the conductive surface disclosed by the Prior Art that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy, manufacturing costs, etc. (see *In re Boesch*, 205 USPQ 215 (CCPA 1980)), and since neither non-obvious nor unexpected results, i.e., results which are different in kind and not in degree from the results of the prior art, will be obtained as long as an opening in the housing is

used as already suggested by the Prior Art. Note that Gotoh suggest that the surface roughness is a variable that can be subjected to optimization (cols 4-7).

Response to Arguments

18. Applicant's arguments filed on 02/19/2003 have been fully considered but they are not persuasive.

19. Applicant argues that the conductive foil is not a substrate. Nonetheless, according to the general definition of substrate the insulating layer 22 is a substrate. The term substrate is interpreted as an underlying support or layerⁱ.

20. Applicant argues that Elenius does not disclose a second contact pad formed in a second opening and extending over a portion of the first electrical contact pad and contacting the first electrical contact pad. However, Elenius clearly shows this limitation. Elenius's figure 2 shows a second electrical conductive pad 30 formed in the second opening (*the opening of layer 24*) and extending over and contacting a portion of the first electrical contact pad 18.

Conclusion

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then

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the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

22. Papers related to this application may be submitted directly to Art Unit 2826 by facsimile transmission. Papers should be faxed to Art Unit 2826 via the Art Unit 2826 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2826 Fax Center number is **(703) 308-7722** or **-7724**. The Art Unit 2826 Fax Center is to be used only for papers related to Art Unit 2826 applications.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Leonardo Andújar** at **(703) 308-0080** and between the hours of 9:00 AM to 7:30 PM (Eastern Standard Time) Monday through Thursday or by e-mail via Leonardo.Andujar@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn, can be reached on (703) 308-6601.

24. Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at **(703) 305-3900**.

25. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass (es): 257/690, 691, 698 and 700	04/02
Other Documentation:	

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Electronic Database(s): East (USPAT, US PG PUB, JPO, EPO, Derwent, IBM TDB)	04/02
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Leonardo Andújar

Patent Examiner Art Unit 2826

LA

4/15/03

sub·strate

sub·strate (sùb'strát') *noun*

1. The material or substance on which an enzyme acts.
2. *Biology.* A surface on which an organism grows or is attached.
3. An underlying layer; a substratum.

[From substratum.]ⁱ

sub·stra·tum

sub·stra·tum (sùb'strâ'tem, -strât'em) *noun*

plural **sub·stra·ta** (-strâ'te, -strât'e) or **sub·stra·tums**

1. a. An underlying layer. b. A layer of earth beneath the surface soil; subsoil.
2. A foundation or groundwork.
3. The material on which another material is coated or fabricated.
4. *Philosophy.* The characterless substance that supports attributes of reality.
5. *Biology.* A substrate.

[New Latin, from neuter of Latin *substrātus*, past participle of *substemere*, to lay under : *sub-*, *sub-* + *stemere*, to stretch, spread.]

— sub·stra'tive *adjective*ⁱ

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